

9/394,647

REMARKS:

Claims 1-21 are pending, of which claim 11 has been allowed, claim 2 has been objected to, and claims 1, 3-10, and 12-21 have been rejected.

Claim 1 has been amended to add the limitations of claims 2 and 3, and also add the limitation that the azo dye could be amaranth – as supported by page 5, lines 8-11 of the original specification.

Claim 11 has been amended to properly cite a concentration of about  $5 \times 10^{-3}$  mol/l for the Evans blue azo dye, corresponding to the original disclosure on page 5, line 16.

Claim 12 has been amended to take into account the cancellation of claim 2 and 3.

Claim 18 has been amended to cite the solution of claim 11 or the solution of new claim 22.

Claim 19 has been amended to include the spectrophotometer measurement of 521 nm for amaranth – as supported by disclosure in original claim 19.

Claim 21 has been added to cite an aqueous solution of an amaranth dye, borate buffer, aqueous ammonia and a sodium salt of EDTA. This amendment is supported by original disclosure at page 6, lines 7 to 11.

It is believed that no new matter has been added by these amendments.

35 U.S.C. 112

Claims 15 and 18-19 stand rejected under 35 U.S.C 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 15 has been amended to depend from claim 1, making the rejection mute. Claim 18 has been amended to cite the solution of either claim 11 or of new claim 22, making the rejection mute.

35 U.S.C. §102(b)

Claims 1, 7-9 and 12 stand rejected under 35 U.S.C. §103(a) as being anticipated by Steinman, U.S. Patent Number 5,397,710. The Steinman reference describes a method for measuring magnesium using a dihydroxyaryylazo complexometric dye. Applicant's amended claims require an azo dye selected from the group consisting of amaranth or Evans blue. Neither amaranth nor Evans blue are dihydroxyaryylazo compounds. The Steinman reference fails to

9/394,647

teach or suggest all of Applicant's claim elements (amaranth or Evans blue) and therefore it fails to present a *prima facie* case of anticipation under 35 U.S.C. §102(b). Further, the Steinman reference fails to teach Applicant's claim element that the azo dye changes its coloration or coloration intensity in the presence of chlorine dioxide, again failing to present a *prima facie* case of anticipation under 35 U.S.C. §102(b)

Applicant therefore requests that this rejection be withdrawn.

### 35 U.S.C §103(a)

Claims 1, 3-10, 12-17 and 20-21 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Hofmann et al. (1998, *Environmental Technology* 19:761-773; "Hofmann") or Knechtel (1978, *Analytical Chemistry* 50(2):202-205; "Knechtel" in view of Hutchings, U.S. Patent Number 4,880,556.

#### Hofmann

The Hofmann reference describes a method for the spectrophotometric measurement of chlorine in drinking water using amaranth in a solution buffered by ammonia. There is no teaching or suggestion of any other buffering systems, such as the Applicant's required borate buffer, nor of the metal-chelating agents claimed by Applicant. Since Hofmann fails to teach or suggest all of Applicant's claim limitations, it fails to provide a *prima facie* case of obviousness under 35 U.S.C. 103(a).

Further, The Hofmann reference teaches away from a borate buffer by specifically teaching an "ammonia-buffered" solution (page 762, column 2, line 9 – to which the amaranth solution is identical). One of skill in the art would have no motivation to add an additional borate buffer when the system is already described as properly buffered. Applicant claims the use of a masking agent – which preferably is aqueous ammonia – in addition to the borate buffer

Nor would one of skill in the art be motivated to arrive at Applicant's claims from the Hofmann reference by routine experimentation, since the need for a borate buffer is not recognized as a result-effective variable. The Hofmann solution is already buffered by ammonia and there is no suggestion that any additional buffer would be useful, let alone a borate buffer.

9/394,647

Knechtel

The Knechtel reference describes a method for the determination of chlorine dioxide in sewage effluent using acid chrome violet K using an ammonium chloride – ammonia buffer. The Knechtel fails to teach or suggest all of Applicant's claim limitations, and thereby fails to provide a *prima facie* case of obviousness under 35 U.S.C. 103(a). In particular, the Knechtel reference fails to teach or suggest the amaranth or Evans blue required in Applicant's amended claims, and also fails to teach or suggest a borate buffer.

The Knechtel reference teaches away from Applicant's claim limitations by requiring acid chrome violet K, and by teaching an ammonium chloride/ammonia buffer as the sole buffer needed. One of skill in the art would not arrive at Applicant's claims requiring an azo dye that is either Evans blue or amaranth, and a borate buffer from Knechtel's teaching of an acid chrome violet K dye and an ammonium chloride/ammonia buffer. Nor is any motivation offered to reach Applicant's claims through routine experimentation, since the missing claim limitations are not recognized as result-effective.

Hutchings

The Hutchings reference is a secondary reference cited by the Examiner to show several situations in which the production of chlorine dioxide is prevented by the use of a borate buffer. The object of the Hutchings reference is that a borate buffer can be used to raise the pH above 9 (preferably 9-10.5) in a cleaning solution and help stabilize the colorant so it can retain its tinctorial value (Col. 1, line 66).

There is no motivation for one in the art to combine the Hutchings reference with the Hofmann, or Knechtel references since they are in a different art, solve opposite problems, and teach a different working pH range.

First, the Hutchings reference is a different art from the Hofmann and Knechtel references. The Hutchings reference describes a cleaning solution having an alkali metal halogenite while the Hofmann and Knechtel references describe indicator solutions.

Second, the object of the Hutchings reference is to prevent a change in color of a colorant, while the Hofmann and Knechtel references require that the solution change in coloration to serve as an indicator. One in the art of spectrometric indicator solutions would not seek to hinder the change in coloration of the dye.

9/394,647

Third, the Hutchings reference deals with solutions at a pH of 9.0 to 10.5, while the Hofmann method occurs at a pH of 8 to 9. Since a buffer chosen is directly related to the pH of the solution at issue, one would not be motivated to use a buffer described at an ion concentration which differs by a factor of 10.

Finally, both the Hofmann and Knechtel references already teach buffer systems (ammonia or an ammonium chloride/ammonia solution) that are effective in the methods described in the references. There is no motivation to seek a different buffer system, whether from within the art, or outside the art. There would be no motivation to seek a different buffer system by routine experimentation, since the need for a different buffer system is not recognized as result-effective.


The Hutchings reference fails to correct the deficiencies of the Hofmann reference. There is no motivation in either reference to combine these references in different arts, at different pHs when one system seeks no color change while the other depends on a color change. Additionally the Hofmann reference already describes a buffered system, and there is no teaching or suggestion to motivate one to use any other buffering system.

The Hutchings reference also fails to correct the defects in the Knechtel reference of not teaching or suggesting Applicant's amended claim elements of an azo dye selected from amaranth or Evans blue. Thus while there is no teaching or suggestion in either reference that would motivate one to combine the references, a combination of the references would still fail to present a *prima facie* case of obviousness.

In view of the above, the Applicant believes that the reasons for rejection have been overcome, and the claims herein, as amended, should be allowable to the Applicant. Accordingly, reconsideration and allowance are requested.

9/394,647

Respectfully submitted;

  
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Thomas F. Roland, Esq.  
Attorney for the Applicants  
Reg. No. 42,110

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ATOFINA Chemicals, Inc.  
Patent Department - 26th Floor  
2000 Market Street  
Philadelphia, PA 19103-3222  
Tel (215) 419-7314  
Fax (215) 419-7075

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